Saskatchewan
Energy and Mines
Saskatchewan
Geological Survey

Saskatchewan Exploration and Development Highlights 1995

A.J. Gracie, P.L. Schwann, and W.A. Patterson

1995

104-04213/

Saskatchewan Exploration and Development Highlights 1995

A.J. Gracie [1], *P.L. Schwann* [1], *and W.A. Patterson* [2]

Surface mineral exploration expenditures are estimated at $23 million in 1995, a decrease of $6 million over the actual 1994 figure (Table 1). Underground expenditures at the Cigar Lake and McArthur River test mines total $27 million, some three times surface uranium exploration which has remained fairly stable for five years. Although both gold and base metal expenditures remain depressed, positive notes are provided by potential new production from the Komis gold mine and the Konuto copper mine anticipated for spring 1996 and fall 1997 respectively. In addition, the feasibility study results from the Goldfields Project also appear favourable. In respect to diamonds, while exploration expenditures are expected to decrease to half those of 1994, drilling and sampling of the Fort-à-la-Corne (FALC) and Candle Lake diamondiferous kimberlites has continued.

Table 1 - Exploration expenditures.

	1994 (actual)	1995 (estimated)
Uranium	11 (45)	11 (27)
Gold	4 (4)	4 (11)
Base Metals	4	3
Diamonds	10	5
Total	29	23

Notes:
Figures are rounded to the nearest million dollars.
Uranium and gold test or developing mine expenditures are in brackets.

URANIUM

Saskatchewan remains the focus of uranium exploration and development in Canada. An excellent reserve base and an average, restricted 1994 spot price of $US9.31/lb U_3O_8 continues, however, to curtail exploration and no new world class discoveries were made this year. The restricted 1995 spot market price increases, to an average of $US11.31/lb U_3O_8 for the first nine months of the year, offers hope of a market-driven upswing in uranium exploration in the future. On the development side, the McClean Lake project is under construction and Environmental Impact Statements for the Cigar Lake and Midwest projects have been submitted for review. At Cluff Lake, the Dominique-Janine extension open pit is in production and the underground mine is being developed. At McArthur River, the underground drilling project is complete and results appear to exceed expectations.

Cameco is the key player in uranium mining and exploration, controlling some 47 percent of currently identified reserves. Cameco's ownership is public shareholders (70.3%) and Government of Saskatchewan (29.7%), after the Government of Canada sold its remaining shares in early 1995. Saskatchewan's mines produced 9004 t U (23.4 million lb U_3O_8) in 1994, up six percent from 1993, making the province the world's leading producer with 93 percent of Canadian output and approximately 28 percent of world output. Sales amounted to 8324 t U (21.6 million lb U_3O_8) valued at $407.8 million in 1994. Uranium production and sales in 1995 should exceed those of 1994.

Reserve and production figures for the three main mines are presented in Table 2. Currently identified reserves within the Athabasca Basin are sufficient to sustain production well into the next century. On the exploration side, some ten companies make up current uranium exploration joint ventures. Exploration in all parts of the Athabasca Basin is aimed at the discovery of another major deposit of the Key Lake–Cigar Lake unconformity type, although as usual, it is concentrated in the east and southeast. Discovery potential still remains high as mineralized holes are common in this area where programs may test unconformity targets at depths exceeding 500 m.

Geophysics

The majority of geophysical tools applied in uranium exploration in the Athabasca Basin focus on graphitic basement conductors. These targets typically show moderate to strong conductivity and are located at the unconformity. Both transient and frequency electromagnetic methods are used.

Frequency EM, represented by the Apex MaxMin system is used primarily for conductor depths up to 250 m, horizontal loop (HLEM) being the most common method used. The depth of exploration is proportional to the coil separation, which must be approximated depending on expected depth. Frequency selection is also a factor in depth penetration with the lower frequencies providing better depth penetration and coupling with stronger conductors. MaxMin has been used to a large extent in the Basin since its conception in the mid-1970's. Traditionally frequencies ranged from 444 to 3555 hz and, although these are well suited to the graphitic conductors, newer systems now provide a broader band up to 14 khz, yielding more data for interpretation (soundings), as well as coupling better with weaker conductors.

(1) Resident Geologists, Saskatchewan Energy and Mines, P.O. Box 5000, La Ronge, SK S0J 1L0.
(2) Patterson Mining Geophysics Ltd., P.O. Box 682, La Ronge, SK S0J 1L0.

Table 2 - Published reserves from Saskatchewan uranium mines.

Owner(s)*	Property/Deposit	Reserves (t U) (Unstandardized)	Grade %U	Production (t U) 1994***	1995****
	MINEABLE**				
Cameco–Uranerz Expl. Mining	Rabbit Lake			2870	3075
	Collins Bay B	770	0.27	–	–
	Collins A	6 500	4.82	–	–
	Collins D	2 200	1.86	–	–
	Eagle Point	14 850	1.09	–	–
Cameco–Uranerz Expl. Mining	Key Lake Deilmann	26 900	1.45	5074	5385
Cameco–Uranerz Expl. Mining–Cogema Res.	McArthur River P2N	72 700	15.9	–	–
Cigar Lake Mining (Cameco–Cogema Res.–Idemitsu–Kepco)	Cigar Lake	150 000	7.8	–	–
Cogema Res.–Corona Grande	Cluff Lake	15 000	0.8	1052	1200
Minatco–Tenwest–OURD	McClean, JEB, and SUE Trend	19 300	2.78	–	–
Minatco–Tenwest–Uranerz Expl. Mining–OURD	'Midwest'	13 800	3.7	–	–
	GEOLOGICAL**				
Cameco–Uranerz Expl. Mining	Eagle Point	9 300	0.9	–	–
Cameco–Cogema Res.–PNC–Kepco	Dawn Lake	11 500	1.67	–	–
Cameco–Uranerz Expl. Mining–Cogema Res.	McArthur River P2N	87 600	10.19	–	–

Notes:
* Operator first.
** 'Mineable' and 'Geological' are Cameco definitions. All figures in the table may not be exactly comparable.
*** 1994 production figures from the Cameco annual report in those cases where Cameco controls the deposit.
**** 1995 production estimated.

Instruments used for transient EM (TEM) surveys include the Geonics Protem/37 and Lamontagne UTEM systems. These systems penetrate to depths of 1000 m.

The Geonics Protem/37 system employs several survey methods including large fixed loop, moving loop (slingram), stepwise moving loop, and borehole. The loops vary in size from 800 m x 600 m to 1600 m x 1600 m for fixed loop and 400 m x 400 m to 800 m x 800 m for the moving loop. Typically two components are measured, Z (vertical), and X (horizontal in line). A third component, Y (horizontal orthogonal), is measured occasionally.

Three generations of Geonics instrumentation are being used in the Athabasca Basin, all apparently providing similar data quality. The main advantages of the newer systems are size, weight, and operating speed. The newest Protem receiver, for example, has the capability to measure up to three components simultaneously.

UTEM is a large-loop time domain EM system which measures the electromagnetic step response of the earth. The transmitter establishes a highly regulated triangular current waveform in the source loop. Measurements of the EMF are made by a roving receiver. The data channels are averaged over ten or twenty time windows, which typically extend from 15 µs to 16 ms after each peak waveform. The system has been specifically designed to have enhanced sensitivity to very long time constant (very large and/or very conductive) structures.

In the search for large graphitic conductors associated with uranium mineralization, the UTEM system has been used in three survey configurations. Two of these, fixed-loop and moving-loop modes, are ideal for direct detection of large, steeply dipping graphitic zones in the basement. The third method is the common receiver array, or CRA. Geophysical methods are also used to map resistivity contrasts within the sandstone cover. These methods include VLF-EM, HLEM and DC resistivity. The objective of this work is to detect resistivity contrasts resulting from the presence of clay alteration, water filled fractures, and/or silicification.

Rabbit Lake

Cameco, operator (66.7%); Uranerz Exploration and Mining Ltd. (33.3%).

The Rabbit Lake mill continued to operate on a one-week-up/one-week-down schedule in 1994. Production rose by almost 20 percent to a record 2870 t U (7.5 million lb U_3O_8) since completion of modifications to the mill in the early '90s. Most of the mill feed came from the Eagle Point underground mine which received regulatory approval in 1994. The remainder was obtained from ore stockpiles of the previously mined out Collins Bay B zone open pit.

Two other orebodies at Rabbit Lake, the Collins A and D zones, are scheduled for development. In 1994, Cameco began construction of a dike to isolate the D zone open pit, which is under Collins Bay. Construction was completed during the third quarter of 1995 and mining of this relatively small, yet high-grade, deposit will begin in the winter of 1995-96. At the same time, diking of the A zone will proceed to permit mining in the winter of 1996-97.

Cluff Lake

Cogema Resources Inc., operator (80%); Corona Grande Exploration Corp. (20%).

At Cluff Lake, 1994 production was 1052 t U (2.7 million lb U_3O_8) from a combination of ore derived from the Dominique-Peter and Dominique-Janine extension deposits. Production is expected to increase dramatically in 1996 to 2000 t U (5.2 million lb U_3O_8) by running the mill on a 24 hour basis.

To support this increase in production 1994 was a year of expansion at Cluff Lake and a three phase mining plan to exploit the Dominique-Janine was initiated. First, the Dominique-Janine extension open pit overburden was stripped, and ore and waste were then extracted on various benches, down to bench 311 by mid-December 1994. The pit is scheduled to last to the end of 1997. The excavation waste is being used to back fill the Dominique–Janine North and Claude open pits. Second, the Dominique-Janine underground ramp was also developed. Conventional mining methods (undercut and fill) will be employed to extract ore to the south and below the Dominique-Janine open pit where rock type, structural patterns, and ore grades resemble the Dominique-Peter underground mine located about 1 km to the northeast. Third, surface jet boring and/or blind boring methods are being considered to mine ore pods located at or near the unconformity between the basement and the Athabasca Group sandstones proximal to Cluff Lake. A freeze test to check the freeze-thaw characteristics of the overburden along Cluff Lake has been carried out. The three-stage process will mine a total of 683 500 t ore, grading 0.73 percent U and containing some 5000 t U.

Production in the Dominique-Peter underground mine in 1994 was derived from the Upper B, A_1/A_2, and DP Center and North stoping areas. Development mining continued with the completion of an access ramp to the DP North subvertical vein systems and lower DP Center vein systems. Mining of the A_1/A_2, DP Center subvertical vein systems, and the DP North low angle vein systems continued in 1995. As the A_1/A_2 Southeast and Center stopes became exhausted a sill cut development was begun in the DP North, East, and Northwest stoping areas. Surface exploration drill programs again followed up the positive results in previous drilling north of the Dominique-Janine mine.

Key Lake

Cameco, operator (66.67%); Uranerz Exploration and Mining Ltd. (33.33%).

Key Lake, where the Deilmann open pit is almost mined out, is the largest high-grade uranium deposit in the world. Mining will be complete in 1996. Mill production in 1994 was 5074 t U (13.2 million lb U_3O_8) down 4.6 percent from 1993. In 1994, the accelerated mining program of the Deilmann continued in order to allow earlier development of the in-pit "pervious" surround tailings facility for which government approval has been received. The stockpiled ore will supply feed to the mill until 1999 when ore from the McArthur River deposit, located 115 km northeast of Key Lake is tentatively scheduled to be available. McArthur River ore will give the Key Lake mill a minimum of 15 more years of operation. Mining of Deilmann progressed well during 1995, but the metallurgical composition of the ore from the lower levels of the pit created a number of milling difficulties primarily in the pressurized leach circuit. Modifications in both equipment and procedures corrected the problem, but necessitated a shutdown of four weeks.

Cameco is also investigating the possibility of extracting nickel and cobalt from the Key Lake tailings. A pilot plant will run a four month test project starting in January 1996. If successful, a 840 tpd plant costing $45 million could be in operation by 1997. The new operation would process approximately 3 million tonnes of uranium tailings over its lifespan, recovering 3175 t Ni and 263 t Co annually for about 11.5 years.

Cigar Lake

Cigar Lake Mining Corporation: Cameco Resources Ltd. (48.75%); Cogema Resources Inc. (36.375%); Idemitsu Uranium Exploration Canada (12.875%); and Korea Electric Power Corporation (2.0%).

The Cigar Lake Mining Corporation joint venture partners have agreed to develop and operate the $410 million Cigar Lake mine which is on care and maintenance. An Environmental Impact Statement has been submitted for review by the joint federal-provincial panel. Assuming project approval, responsibilities will be reassigned so that: Cameco will operate the mine; ore will be processed approximately 80 km away at the McClean Lake mill, operated by Cogema Resources Inc.; and Idemitsu Uranium Exploration Canada Ltd. will provide administrative services and monitor the activities of the mine and mill operators.

To accommodate Cigar Lake ore, the McClean Lake mill will be expanded from an annual capacity of

2300 t U (6 million lb U_3O_8) to 9200 t U (24 million lb U_3O_8). Under the terms of the agreement, the Cigar Lake joint venture will produce up to 6900 t U (18 million lb U_3O_8) per year and the McClean Lake joint venture will produce 2300 t U (6 million lb U_3O_8). The new milling arrangements offer several environmental advantages, including the shared use of a common tailings facility in the mined out JEB deposit pit and a simplified decommissioning and reclamation program. The economic advantages include economies of scale, reduced capital costs, and an accelerated schedule for Cigar Lake ore. The $410 million project price tag includes the expansion of the McClean Lake mill.

Underground development, and the construction and expansion of the surface facilities are scheduled to commence in 1997, after all permits are in place, and will take two years. Mining will be undertaken in two phases: phase 1, beginning in 1999 and lasting 13 years, will deal with the rich eastern part of the orebody, while phase 2 will remove the remainder. After a start-up period of one to two years with increasing production, the mine will be able to produce annually, up to 6900 t U (18 million lb U_3O_8) during phase 1. During phase 2, annual production from the lower grade ore will drop to 2300 t U (6 million lb U_3O_8), but will last a further 28 years. Reclamation and decommissioning will follow, if no additional reserves are discovered, and take up to five years.

Access to the underground workings is by a test mine shaft - the No. 1 shaft. A second shaft will provide an alternative access, and will be the exhaust outlet for the primary ventilation system. Mine rock will be hoisted through the No. 1 shaft. The ore, in the form of a ground slurry, will be pumped to surface through specialized cased boreholes. A third shaft is planned for phase 2. Drifts on two levels will be developed in basement rock beneath the orebody. From these drifts the ore will be mined in panels using a jet boring, non entry method in a frozen orebody. Freezing will improve ground conditions, prevent water inrush and stop radon migration.

Midwest Property

Midwest Joint Venture: Minatco Ltd. (56%); Tenwest Uranium Ltd. (19.5%); Uranerz Exploration and Mining Ltd. (20%); and OURD (Canada) Co. Ltd. (4.5%).

Although the Midwest mining project, as described in the 1991 Environmental Impact Statement, failed to receive government approval, Cogema Resources Inc., the majority owner and joint venture operator, still anticipates development of the McClean and Midwest properties in a complementary manner and has submitted a revised Environmental Impact Statement for the Midwest project. Cogema looked for ways to overcome the safety and environmental concerns identified during the review process. A new mining plan recommends using the jet boring method, tested at Cigar Lake under very similar geological conditions. Ore will be milled off-site at McClean Lake. This new approach addresses the radioactivity and water inflow concerns at Midwest. Non entry mining improves radiation protection because the high-grade ore is contained in pipes and tanks. Also, water inflow will be reduced dramatically by ground freezing. Since Mink Arm of McMahon Lake will not be drained, environmental impacts will be significantly reduced.

Assuming government approval, development at Midwest is planned to start in 2000 and production in approximately 2003 when the open pit mining phase at McClean Lake ends. The Midwest mine will produce 2200 t U (5.7 million lb U_3O_8) per year for six years, after which the underground operation at McClean Lake will be ready to take over.

McClean Lake

Minatco Ltd. (70%); Denison Mines Ltd. (22.5%); and OURD (Canada) Co. Ltd. (7.5%).

Cogema Resources Inc. announced the decision to develop the $250 million McClean Lake project in March 1995. Construction is on a fast track with $100 million scheduled to be spent in 1995 and production to begin in mid-1997. The 1995 schedule provided for a temporary camp, followed by the permanent camp, the water treatment plant, and the mill offices. Open pit mining will begin this October, the ore being stockpiled until the mill is constructed in 1996. The JEB pit will be mined out by the end of 1996 and prepared for use as a tailings management facility. The tailings will be deposited underwater in paste form in the pit and when consolidated will prove less permeable than the Athabasca Group sandstone host rocks, which will act as a pervious surround envelope.

Open pit mining will continue until the end of 2003 with successive development of the SUE C, A, and B open pits. As noted, this open pit mining will be followed by the Midwest underground mine from 2003 to 2008 and the McClean underground mine from 2009 to 2011. Milling of both McClean Lake and Midwest ores at the McClean Lake mill will provide for a total of 15 years operation at a production rate of 2300 t U (6 million lb U_3O_8) per year without considering Cigar Lake ore.

The SUE A, B, C, and CQ deposits are clustered on the western edge of the presumed Archean Collins Bay "dome", within a 2.9 km long northerly trending zone. The SUE A and B deposits are hosted by altered Athabasca Group sandstones at and above the basement unconformity. The SUE C and CQ deposits occur in Aphebian Wollaston Group basement rocks flanking the "dome" at depths of 70 to 180 m below surface. The deposits are located within a zone of faulting and alteration. In the SUE A and B deposits, uranium oxides and silicates are associated with Ni-Co arsenides and Fe-Ni-Co-Cu sulphides. The SUE C and CQ deposits consist mainly of uranium oxides. The SUE A and B deposits were discovered by drilling conductive zones delineated by ground VLF and HLEM (MaxMin) techniques. The SUE C and CQ deposits were identified by drilling DC resistivity and IP anomalies located 100 m away from the conductor axis. This successful work provides an alternative exploration model for the Athabasca Basin.

McArthur River - P2 North

Cameco, operator (53.991%)(56.435%); Uranerz Exploration and Mining Ltd. (29.775%)(27.331%)*; and Cogema Resources Inc. (16.234%). ( )* These figures are ownership at production.*

During 1994-95, a 5.5 m diameter, circular concrete-lined shaft was sunk to a depth of 550 m. On the 530 m level, an approximately 140 m long crosscut was driven west from the shaft and a drill drift developed in hanging-wall basement rocks parallel to the northeast-trending thrust fault controlled linear orebody. The drift was used to test the deposit over a 300 m strike length with a 10 000 m drill program. The objectives of the program included investigation of ground conditions and hydrogeology, as well as local orebody definition and reserve calculation. The results will be used to design a mining method, complete a feasibility study and prepare an Environmental Impact Statement based on annual production of 6900 t U (18 million lb U_3O_8) through the Key Lake mill. This plan eliminates the need to construct a separate mill and waste management facility. Assuming project approval, construction, including an all weather road, could begin in mid-1997 and would take two years to complete. Production would follow in mid-1999 upon the exhaustion of the Key Lake reserves.

As a result of the underground program, geological reserves have been revised upwards to 160 000 t U (416 million lbs U_3O_8) with an average grade of 12.7 percent U (15% U_3O_8). Included in the geological reserves are mineable reserves of 72 700 t U (189 million lb U_3O_8), contained in 457 000 t ore grading 15.9 percent U (18.8% U_3O_8). Cameco anticipates that with continued underground drilling additional geological reserves will be upgraded to mineable reserves. Potential to expand total reserves is considered to be excellent.

The site has a temporary camp, airstrip, offices, water treatment plant, and is connected to the SaskPower Grid. Particularly favourable features of the deposit include: size, grade, proximity to Key Lake, and the ore composition, which is suitable for treatment at the Key Lake mill.

GOLD

Gold, like uranium is in a mining development phase. A Cameco operated joint venture put the Contact Lake mine into production. Claude Resources Inc., now Saskatchewan's largest primary gold producer, continues to operate the Seabee mine successfully and Waddy Lake Resources Inc. plans to have the Komis deposit in production by the spring of 1996. While these mines illustrate that there are opportunities in the province, gold exploration is being undertaken by less than ten companies compared to over 60 in 1988. Greater Lenora Resources Corp., active throughout the year on the Box and Athona properties south of Uranium City, is preparing a feasibility study. Claude Resources Inc. has an option agreement with Cameco Corporation and Husky Oil Operations Ltd. (the Amisk joint venture) to explore and develop the Amisk/Laurel Lake gold property in the Flin Flon area. Claude will spend $2.5 million to earn a 35 percent working interest in the property.

Geophysics

The geophysical methods used in exploration for shear-hosted gold mineralization are magnetics, VLF-EM, induced polarization, resistivity and to a lesser extent HLEM. Because magnetics and VLF-EM are the most cost effective, they are most commonly applied. The newest instruments supplied by GEM systems and Scintrex combine both methods into a one man operated unit. Data acquired are used to map rock types and structure. In a few cases the deposit can exhibit a direct magnetic and VLF-EM response. For example the Rod zone has a magnetic signature due to pyrrhotite and a conductive response due to semi-massive sulphides; however, because of the lack of overburden, the Rod zone is a favourable subject. Weakly conductive overburden consisting of swamp and lake can effectively mask underlying bedrock conductors due to the relatively high frequency (24.0 khz) used in the VLF-EM method.

HLEM is used less in gold exploration although this method has increased capabilities for identifying potential shear-hosted gold mineralization, because of a broader frequency range, the ability to measure from multiple frequencies, and the higher power. Although this system will couple with a wide range of conductors and provide some discrimination of overburden effects, the higher frequencies will still attenuate in the presence of conductive overburden.

The induced polarization and resistivity method is well designed to detect disseminated to massive sulphide occurrences within a non-conductive host rock such as quartz. The method successfully delineated the Jolu, Jojay, Contact, and Star Lake deposits. The survey's main disadvantage is cost. The several current electrode arrays being used include dipole-dipole, pole-dipole, and gradient.

La Ronge Domain

Contact Lake

Cameco, operator (66.7%); Uranerz Exploration and Mining Ltd. (33.3%).

The $36 million Contact Lake gold mine, 63 km north of La Ronge, was officially opened on February 22, 1995. Situated in the Lac La Ronge Provincial Park, the Contact Lake mine has 1.3 million t of mineable ore reserves grading 8.0 g/t (0.23 oz/ton) Au containing 337,000 ounces of gold (see Table 3). The mine also has geological reserves of 194,000 oz at Contact Lake and 60,000 oz nearby at the Pap zones. Mining is by a ramp over 1.5 km long to the 5240 level (210 m below surface), four levels, and blasthole stopes. Some shrinkage stopes are also planned. The 700 tpd mill was completed in December 1994. Annual production is projected at 60,000 oz at a cost of $300 ($US210) per ounce, however, 1995 production will likely fall short of this target. The mine, potentially the largest in Saskatchewan's history, has an estimated life of six years. Additional geological reserves and ongoing exploration may extend this period.

Table 3 - Published reserves from selected Saskatchewan gold properties.

Owner(s)*	Property	Reserves (t) or Production (oz or t)	Grade g/t	Grade oz/shrt ton
	MINED OR MINED TO DATE			
Cameco–Starrex Uranerz Expl. Mining	Star Lake mine 21+Rush zones**	76 947 oz 182 291	14.7	0.43
Cameco–Shore Gold	Jasper mine**	82 697 oz 140 127	18.8	0.55
Claude Res. Inc.	Seabee	205 285 oz		
Corona Corp.– Int. Mahogany Corp.	Jolu mine Rod+Mallard**	203 571 oz*** 472 220	14.4	0.42
Greater Lenora Res. Corp.	Box	64 066 oz		
	MINEABLE			
Cameco–Uranerz Expl. Mining– Westward	Contact Lake mine Bakos zone	1 304 000	8.0	0.23
Claude Res. Inc.	Seabee	450 000****	10-11	0.3
Greater Lenora Res. Corp.	Box+Athona	16 600 000	1.7	0.05
Kristo Gold	Anglo-Rouyn mine tailings	1 451 500*****	0.55	0.016
Waddy Lake Res.	Komis	687 300	10.3	0.3
	GEOLOGICAL			
Cameco–Uranerz Expl. Mining	Contact Lake	573 000	10.5	0.31
Cameco–Uranerz Expl. Mining	Pap	233 000	8.0	0.23
Claude Res. Inc.	Seabee	368 280	10-11****	0.3
Claude–Cameco–Husky Oil	Laurel Lake	426 400	11.3	0.33
Golden Rule Res.	Corner Lake	181 000	13.0	0.38
Golden Rule Res.	Niko	85 700	6.2	0.18
Golden Rule Res.–Int. Mahogany Corp. Comaplex Res.	Tower East	922 000	6.9	0.2
Greater Lenora Res. Corporation	Box+Athona	5 540 000	1.42	0.04
Radcliffe Res. Inc.	"North" Lake	2 360 000	2.4	0.07
Royal Oak–Golden Rule Res.–Cameco	Twin	351 100	6.2	0.18
Tyler Res.–Golden Rule Res.–Cameco	Weedy B Golden Heart	314 000 687 000	4.8 10.3	0.13 0.3
Waddy Lake Res.	EP Komis	227 000 573 300	5.8 13.4	0.17 0.39

Notes:
- * Operator first.
- ** Mined out.
- *** Additional 1500 oz estimated recovered during clean up. Possibly additional oz were also recovered in the test run.
- **** Approximate grade only.
- ***** Anglo-Rouyn mine tailings also contain 1.97 g/t (0.058 oz/ton) Ag, 0.19% Cu, and 4.5% magnetite.

Byers Fault Area: Komis Deposit

Waddy Lake Resources Inc. (100%)

Golden Rule Resources Ltd. and Waddy Lake Resources Inc. have merged with the result that Waddy will become a wholly owned subsidiary of Golden Rule. The merger of the two companies is designed to facilitate financing of the Komis gold deposit, anticipated to come into production in early 1996. An Environmental Impact Statement has been submitted enabling this schedule to be met assuming project approval.

On August 21, 1995, Waddy Lake announced the completion of a positive in-house feasibility study which had been reviewed by Kilborn Engineering. Kilborn substantially agreed with the mining plan, methodology, and accuracy of the Komis ore reserve interpretation and calculation. The calculation estimated proven-probable (mineable) ore reserves at 687 300 t grading 10.3 g/t (0.3 oz/ton) Au (cut and diluted) with additional possible ore reserves amounting to 573 300 t grading 13.4 g/t (0.39 oz/ton) Au (uncut and undiluted). The deposit is open to the west, along strike and down plunge. The mining plan calls for decline access shrinkage and sublevel blasthole stoping and production of 400 tpd over a present mine life of five years. The Jolu mill will process the Komis ore.

The preproduction development capital required for Komis production, Jolu mill rehabilitation, and tailings systems is estimated at $9.805 million (including a 12 percent contingency and 30 day working capital of $1.302 million). The operating cost required for sustaining production over the present project mine life is estimated at $101.44/t ($US73.00/t). The company estimates that the Komis deposit will produce 44,000 to 46,000 ounces of gold annually, depending on mill recovery, at a cost of $US255.00 per ounce.

Anglo-Rouyn Mine Tailings

Kristo Gold Inc. (100%)

Kristo Gold Inc., following the completion of a pilot plant test which recovered 170 ounces of gold from concentrate, has developed a proposal for reprocessing tailings from the historic Anglo-Rouyn copper-gold producer. Total *in situ* reserves are reported to be 894 407 g (26,076 oz) of gold, 3 194 325 g (93,129 oz) of silver, and 2424 t of copper. Most of the gold is free. Approximately 1.1 million t of abandoned tailings will be mill processed in a two year operation running for 120 to 150 days/yr using gravity and magnetic separation technologies. Final cone tails will be pumped to the old pit area and injected into the underground workings. Makeup water for the process will be pumped from one of the mine shafts to assist in dewatering and to make room for the sand fill. The magnetite by-product will be stored and a market found if possible. The project could be in operation by the spring of 1996. The operation has positive environmental features which should prove appealing as the mine site lies in the Lac La Ronge Provincial Park. For example, acid generating sulphides will be removed from the tailings pond and the open pit will be filled.

Other La Ronge Domain Projects

Canadian Mining Resources Inc. drilled six holes on their Lynx Lake property to test targets in the southwest part of the Contact Lake pluton. Uranerz Exploration and Mining Ltd. have optioned this property and continue their grassroots exploration program on the La Ronge Domain. Petro Plus Inc. has optioned Durama Enterprises Ltd. properties in the Missinipe–Sucker River area. The company has drill tested the Devil's Lake property with seven shallow holes and reported visible gold. Golden Band Resources Inc. continued bulk till sampling on properties in the Waddy Lake area. Samples were processed on site by the company.

Glennie Domain

Seabee Mine

Claude Resources Inc. (100%)

To the end of 1994 the Seabee mine had processed 533 471 t ore and produced a total of 169,382 ounces of gold. By October 18th, 1995, the mine had produced 205,285 ounces of gold making it Saskatchewan's largest gold producer. Reserves in early 1995 were 818 300 t ore of which 450 000 t were in the mineable proven and probable category at a grade averaging 10 to 11 g/t Au.

For the year ending December 31, 1994, a total of 177 785 t was processed producing 50,669 ounces of gold compared to a total of 172 064 t and 57,363 oz in 1993. Tonnes processed for the year represent 122 percent of rated capacity, an increase of 3 percent over 1993 production. Average grade fell from 11.1 g/t Au in 1993 to 9.43 g/t Au in 1994. Gold production for the first six months of 1995 was 21,900 ounces of gold or eight percent lower than the same period for 1994. The lower grade material reflects a large amount of swell from continuing development work. The average mill head grade was 8.2 g/t Au for the first eight months of 1995, however, milling rates increased from 400 to 600 tpd.

In addition to continued work of the 2, 5, and 161 zones, the 162, 163, and 75 zones in the main 161 zone area are being developed. The 161 zone is underneath Laonil Lake, southwest of the 5 zone decline portal. In September, stoping of the 161-160 and 162-160 levels was underway with production from the 161-160 level beginning in August. Access haulage drifting to the 161-250 levels had also begun, stope preparation was well advanced on the 75 vein on both the 120 and 160 levels, and sill drifting was in progress on the 15A vein in 5-1 and the 400 level in 2B.

On surface, a significant winter diamond drill program was undertaken on targets outside of the production area of the Seabee mine and on the surrounding Currie Rose properties. Underground, two new zones have been intersected, one 200 m south and the other 180 m west of 161. These zones will be further explored from underground this winter.

The 2B and 5 zone are structurally controlled in near vertical northeast-southwest-trending ductile shear zones which cut the medium- to coarse-grained, leucocratic to melanocratic, Laonil Lake metagabbro. Gold occurs in association with quartz veining and sulphide mineralization with the highest grades found where shears splay or branch. Ore zones within the shears range in thickness from 1.8 to 5 m. Visible gold is common, occurring with pyrite, minor chalcopyrite, and pyrrhotite. The 161 structure is approximately at right angles to the 5 vein, but quartz veins within the 161 structure follow the same 5 zone trend.

Other Glennie Domain Prospects

Early in 1995, Pine Channel Gold Corp. undertook a high-sensitivity, helicopter-borne magnetic survey in the Wood Lake area and drill tested the Versary zone again, where gold is present in quartz-pyrite-tourmaline veins. The best new intersection was 4.84 g/t (0.141 oz/ton) Au over 2.62 m where previous drilling intersected 13 g/t (0.379 oz/ton) Au over 3.66 m. The corporation also collected rocks and lake sediments from the north end of Larivière Lake. Previous sampling had returned highs of 4280 and 5580 ppb Au within anomalous areas of till. Gold grains in these samples are classified as abraded, irregular, and delicate and it has been assumed that the presence of a high proportion of delicate grains indicates that the source is relatively near. Given the continued operation of the Seabee mine the level of gold exploration in the Glennie Domain is disappointing.

Western Craton

Box and Athona Mines

Greater Lenora Resources Corporation (100%)

The corporation announced in March 1995, the hiring of H.A. Simons Ltd. of Saskatoon to complete a final bankable feasibility study which proved positive and was released October 20, 1995. The combined mining reserve for the Box and Athona properties, cut to 17 g/t (0.50 oz/ton) Au and using a cut-off grade of 0.5 g/t (0.015 oz/ton) Au, is 16.6 million tonnes grading 1.7 g/t (0.05 oz/ton) Au for a mill feed of approximately 900,000 ounces of gold. The geological resource for both properties is 22.35 million t grading 1.7 g/t (0.05 oz/ton) Au for a total of 1.321 million ounces of gold. The geological consulting firm of Watts, Griffis, and McQuat has audited these figures. Management considers these reserves as conservative. An additional 24 holes from the Box pit study area, which included a potential higher grade zone, are still to be added to the Box pit area study and no reserves have been included from the Athona West granite. The Box orebody is open in all directions with significant results having been obtained below and beyond the levels of the current proposed pit. The Athona (Main zone) orebody is open to the southwest; additional work is required on the West Granite, Vein zone and Shoreline zone. Spring and summer 1995 drilling programs totalled 26 015 m in 186 holes, 97 holes (18 560 m) being drilled on the Box and 74 holes (6288 m) on the Athona to define reserves. The remaining holes were for metallurgical testing of both orebodies, for acquisition of geotechnical data, and for exploration.

Operating costs are calculated to be $US212/oz, overall recovery from processing both ores 91.1 percent, and capital costs $66.1 million. The relatively low capital and processing costs are due, for the most part, to economics in ore treatment. Rather than a conventional circuit, a combination of both gravity and flotation can be used and will provide the safety of two different unit operations in maintaining the gold recovery. A project schedule foresees plant commissioning in the summer of 1997. Corporation management believes that due to the high-level of interest the Goldfields project has attracted from international mining companies, the sale or joint venture of the property is a distinct possibility. However, should a suitable offer not be forthcoming, the corporation is capable of putting the property into production itself.

Flin Flon Domain

Amisk Joint Venture

In addition to spending $2.5 million to earn a 35 percent working interest in the joint venture, Claude Resources Inc. can earn another 35 percent by spending a further $14.0 million or by bringing the property into commercial production. The option agreement covers 18 800 ha in the northern portion of Amisk Lake, where Claude has a 100 percent interest in a further 1700 ha. The property covers the western part of the Flin Flon–Snow Lake greenstone belt. The company thinks that the lower greenschist metavolcanics with known carbonatized, sericitized and argillic zones, combined with numerous mesothermal and epithermal gold vein showings, makes this area one of the major underexplored gold camps in Canada. Published reserves at the Laurel Lake deposit are 426 400 t grading 11.32 g/t (0.33 oz/ton) Au. Ore zones are open along strike and at depth. Claude will first thoroughly review all available data and then carry out a substantial exploration program. Exploration will include diamond drilling to expand the Laurel Lake deposit reserves and test several other high-potential gold targets.

BASE METALS

In June 1985, Hudson Bay Mining and Smelting Co., Limited announced the discovery of the Konuto Lake copper deposit in the Flin Flon Domain near the town of Denare Beach. The deposit will likely become the first base metal producer in Saskatchewan, since operations at the Saskatchewan portion of the Flin Flon deposit ceased in 1992. Base metal exploration programs were also undertaken in the Subphanerozoic area, Western Craton, and La Ronge, Wollaston, Glennie, and Kisseynew domains.

Aur Resources has recently acquired 39 base metal properties within Manitoba and Saskatchewan from Granges Inc. Included is Granges portion of the Bigstone copper-zinc deposit, as well as properties in the Hanson, Embury, and West Amisk lakes area. Aur Resources Inc. is reported to have approved a 1995-96 $1 million exploration budget for drilling copper-zinc targets and compiling technical data in preparation for a long-term program.

Flin Flon Domain

Konuto Lake

Hudson Bay Mining and Smelting Co., Limited (100%)

Hudson Bay Exploration and Development Company Limited has successfully delineated a copper deposit immediately east of the town of Denare Beach on mineral disposition S-99618. Drilling of the property was initi-

ated in 1994 following identification of a moderate strength SPECTREM (airborne electromagnetic) anomaly. The same airborne system identified the Photo Lake massive sulphide deposit near Snow Lake, Manitoba. The Konuto Lake deposit is hosted by arc-type mafic volcanics of the Ruth Lake Assemblage, which also contains the past producing Coronation, Birch, and Flexar deposits. The deposit strikes north-south for a maximum of 250 m and dips steeply to the east. Mineralization, consisting of chalcopyrite, pyrrhotite, pyrite, lesser sphalerite, and locally common arsenopyrite and magnetite is contained within two steeply dipping stacked massive sulphide lenses (Red and Blue). Hydrothermal alteration dominated by green-black magnesium-rich chlorite occurs between the Red and Blue zones and locally includes a near-ore grade chalcopyrite-pyrrhotite stringer zone (Green zone) consisting of variably chloritized, carbonatized, silicified rocks with disseminated sulphides. Alteration is localized, occurring only proximal to the sulphide lenses. Mineralization extends from near surface to at least 550 m below surface. To date, geological resources are estimated at 1.44 million t (see Table 4) grading over 6% Cu and 2.5 g/t Au (undiluted), with the bulk of resources contained within the westernmost Red Lens. Four to five years of mine operation are anticipated, at up to 1000 t ore per day. Underground access will either be by shaft or ramp. Ore will be processed in Flin Flon. Mine development is contingent on permitting, but could start by the second quarter of 1996, with production start-up in November 1997.

Callinan Mine

Hudson Bay Mining and Smelting Co., Limited (100% subject to 6.67% NPI with Consolidated Callinan Flin Flon Mines Ltd.)

Mining of the Callinan zinc-copper deposit continued in 1994-1995 with production from the South, East, and North zones. All production to date has come from the Manitoba portion of the deposit, however, production from the Saskatchewan side of the North zone is scheduled for late 1996. From April 1, 1990 to September 1995, the mine produced 2 359 259 t grading 1.43% Cu, 3.58% Zn, 23.8 g/t Ag, and 2.10 g/t Au. The focus of production was the East zone where development has been completed to the 1035 m level and where two years of identified reserves remain. Mining of the South zone has been completed to the 980 m level, and excluding pillars, will be completed this year. The North zone, which straddles the provincial boundary, has been developed to the 600 m level. It lies predominantly within Saskatchewan and contains geological reserves of 562 000 t grading 1.71% Cu, 4.1% Zn, 2.0 g/t

Table 4 - Published reserves from Saskatchewan base metal properties.

Owner(s)* Venture Operator	Property	Reserves (t) or Production (t)	Grade						
			Cu	Zn	% Pb	Ni	Co	g/t Au	Ag
	MINEABLE								
Cameco–Billiton Met. Can.	McIlvenna Bay	13 100 000	1.26	4.95	–	–	–	0.5	24.3
HBM+S	Callinan East, South, North								
	Measured**	1 644 100	1.54	3.32	–	–	–	2.4	27.9
	Indicated***	1 084 800	1.55	3.46	–	–	–	2.6	29.6
	Production	2 359 000	1.43	3.58	–	–	–	2.1	23.8
	GEOLOGICAL								
HBM+S	Konuto Lake	1 440 000	>6	–	–	–	–	2.5	–
Aur.–Cameco	Bigstone Lake	1 451 000	2.9	–	–	–	–	–	–
		308 000	–	11.2	–	–	–	–	–
HBM+S	Callinan North**** (Sask.)	562 000	1.7	4.1	–	–	–	2.0	22.6
Boart–Longyear	Brabant/PEG	4 860 000	0.57	5.19	0.28	–	–	0.2	22.6
Comaplex Resources	HBED zone	589 680	0.5	3.0	–	–	–	–	–
Gitennes option	Howard Lake	54 400	0.44	–	–	1.03	0.04	–	–
Consolidated Pine Channel Gold Corp.	Axis Lake	3 402 000	0.6	–	–	0.6	0.15	–	–

Notes:
* Operator first.
** <30 m drill spacing.
*** 30 to 60 m drill spacing.
**** Geological resources.

(0.057 oz/ton) Au, and 22.6 g/t (0.66 oz/ton) Ag. As of January 1995 proven mineable reserves (<30 m drill spacing) from the East, South, and North zones were 1 644 081 t grading 1.54% Cu, 3.32% Zn, 2.4 g/t (0.070 oz/ton) Au, and 27.9 g/t (0.82 oz/ton) Ag. Probable reserves (30 to 60 m drill spacing) were 1 084 760 t grading 1.55% Cu, 3.46% Zn, 2.59 g/t (0.075 oz/ton) Au, and 29.63 g/t (0.855 oz/ton) Ag.

Exploration activity downplunge of the existing Callinan zones continues. As well, three new lenses have been identified in the hanging wall of the East zone. Although the strike length of these lenses is limited, they have encouraging widths.

Subphanerozoic Area

Cominco Ltd. was the sole company exploring for base metals beneath the Phanerozoic cover. Drilling and UTEM geophysical programs were carried out on both the Tyacke and Muskeg properties. Limited exploration is planned for the Tyacke property in the upcoming year. Although the Bigstone property did not see drill or geophysical programs in 1995, it is anticipated that the new operator, Aur Resources Inc. will renew exploration efforts. At McIlvenna Bay, the Cameco Corporation (operator)–Billiton Metals Canada Inc. joint venture was again inactive.

La Ronge Domain

In the La Ronge Domain, Gitennes Exploration Inc. optioned the Howard Lake Ni-Cu deposit from H. Shupe in June 1995. The property (ML 5180), with drill indicated reserves of 54 400 t of 1.03% Ni, 0.44% Cu and 0.04% Co, has not been actively explored since 1971. An airborne EM and magnetometer survey was flown this summer, and follow-up geophysical and drilling programs were planned for the fall. Mineralization is preferentially contained in the pyroxenite portion of a small ultramafic-mafic intrusion, within migmatites of the Nut Bay Belt.

Wollaston Domain

In the Wollaston Domain, exploration by Noranda Exploration & Development Ltd. for locating sediment-hosted base metal deposits was on hold in 1995.

Glennie Domain

Renewed interest in the base metals in the Glennie Domain has focussed on known showings in volcanic rocks and associated alteration zones. At Pistol Lake, Consolidated Pine Channel Gold Corp. carried out ground geophysics and a drill program to test known copper mineralization hosted in garnet-amphibole-cordierite rocks (interpreted as metamorphosed altered volcanics and/or iron formation). A five hole drill program failed to locate a massive sulphide zone, however, sparsely disseminated copper mineralization was intersected over substantial widths. West of Gee Lake, the historic HBED zone, estimated to contain 589 600 t grading 3.0% Zn and 0.5% Cu, was restaked by Comaplex Resources International Ltd. Uranerz Exploration & Mining Ltd. acquired ground containing gossanous felsic to mafic metavolcanic rocks adjacent to the Hook Lake copper showing.

Kisseynew Domain

Noranda Exploration and Mining Ltd., and Phelps Dodge Corporation of Canada completed exploration programs. Noranda carried out geophysical programs on their Satterley Lake Project, where a previous summer's mapping had outlined a metamorphosed Fe-Mg alteration zone and a number of copper-zinc showings.

Phelps Dodge completed a two and a half year program on the McKenzie/PEG property which they had optioned from Boart Longyear Inc. The program comprised ground geophysics, geological mapping, drilling (11 holes), preliminary metallurgical testing as well as compilation and reinterpretation of previous diamond drilling. The company noted that incomplete core descriptions over a number of drill programs had presented difficulties for geological interpretation. Two stacked sulphide zones are recognized. The Upper zone, intersected by drilling over a more than 800 m strike length and 500 m down dip, correlates very strongly with HLEM and ground magnetometer anomalies. The zone has not been closed off to the northeast. The Lower zone is less well defined and mineralization is associated with amphibolites and characterized by magnetic anomalies. Most of the economic mineralization occurs as sulphide breccia in both the Upper and Lower zones. Reserves are estimated at 4.8 million t averaging 5.19% Zn, 0.57% Cu, 0.28% Pb, 22.6 g/t Ag, and 0.2 g/t Au, using a 2% Zn and 3.0 m minimum width This estimate exceeds those made previously, the majority of this increase being contained within the Upper zone.

Although Phelps Dodge has chosen to relinquish their option, a significant potential for increasing the size of both the Upper and Lower zones was identified. In particular, potential of the Lower zone was illustrated by an intersection of 6.3 m of 13.92% Zn, 0.83% Cu, and 43 g/t Ag in the recent drilling.

Western Craton

The discovery at Voisey Bay has sparked speculation that mafic-ultramafic complexes in Saskatchewan might host a similar Ni-Cu-Co deposit. The geology of the Western Craton has been regarded as potentially favourable for such deposits and Uranerz Exploration & Mining Ltd. staked 41 000 ha of the Clearwater Anorthosite Complex in June 1995. The Complex includes anorthosite, diorite, quartz diorite, norite, mafelsic gneisses and granite. Uranerz has signed a joint venture agreement with Kensington Resources Ltd., who can earn a 50 percent interest in the property by spending $1.5 million over three years, $250,000 of which must be spent in the first year. Uranerz will remain as project operator. An upcoming winter program will comprise 2200 line km of airborne EM and magnetic surveys followed by ground geophysics and drilling. The area is relatively poorly explored.

Consolidated Pine Channel Gold Corp. is re-evaluating drill and geophysical data from its Axis, Currie, and Rea lakes properties on the north shore of Lake Athabasca. High metamorphic grade (granulite facies) mylonitic, differentiated intrusives (norite-pyroxenite) within the Tantato Domain of the Western Craton host numerous gossans with elevated Ni-Cu-Co values. The Axis Lake property is reported to contain 3.402 million t grading 0.6% Ni, 0.6% Cu, and 0.15% Co. Although 1991 drilling results were disappointing, the number of showings and geophysical conductors in the area indicates this vast and relatively unprospected area warrants more thorough investigation.

A grassroots exploration program for Ni-Cu-Co is being carried out by Leader Mining International Inc. in the Riou Lake area. The property is located within the Athabasca Basin along a 20 km long east-west-trending lineament. Gravity and magnetic surveys indicate a mafic intrusion beneath Athabasca Group sandstones which is presumed to be similar to the differentiated intrusions in the exposed Tantato Domain to the north.

DIAMONDS

The amount of land under disposition for diamond exploration has been substantially reduced. On October 1, 1995 these dispositions covered some 2.5 million ha or 37.5 percent less than on the same date in 1994. Diamond exploration expenditures are also expected to decline nearly 50 percent from $10.14 million in 1994 to $5.2 million in 1995. Most of the diamond play properties are in an area running across the province between latitudes 53° and 56° which includes: Fort-à-la-Corne (FALC); the Pasquia Hills and Molanosa Arch; and Candle, Sturgeon, Smoothstone, and Wapawekka lakes. Drilling projects conducted in 1995 were primarily confined to the FALC kimberlite field and its northwest extension in the Candle-Whiteswan lakes area. White Swan Resources Inc. has raised money to continue grassroots work on their Stanley Fault, Montreal Lake, and Nipawin Park projects.

Geophysics

The use of geophysical tools for kimberlite exploration began in Saskatchewan with the interpretation of magnetic anomalies as kimberlites in the FALC area. The initial anomalies were evident on the 1967-69 Geological Survey of Canada aeromagnetic maps flown with a coarse 800 m spacing and a 305 m sensor height. With this success, it was apparent that better results could be realized with the newest airborne systems and tighter line spacing. Airborne magnetics was therefore the primary tool used with follow up ground surveys. Kimberlites were detected in the FALC area at an approximate depth of 150 m, where they contrast well with basement anomalies at a depth of 700 m or more. This contrast provided a distinct advantage for interpretation compared to other areas where the prospective anomalies were in the same depth range as the basement rocks. Gravity and seismic methods have been tested in the FALC area. Although these surveys are effective for confirming magnetic anomalies and drill hole targets, they are not viable as a reconnaissance tool due to high cost.

Kennecott Canada Inc. can acquire a 60 percent interest in the Candle Lake project from War Eagle Mining Company and Great Western Gold Corporation by spending $8 million over five years for exploration and development. In 1994, the Candle Lake joint venture reported the discovery of five diamond-bearing pipes of which three formed a cluster. Diamonds recovered from the pipes in 1994 were 95 percent clear, white stones and the indicator minerals were similar to those from known diamond producers. Kennecott's 1995 drill program, delayed by forest fires, completed nine holes on kimberlite #30C, previously known as kimberlites #29, #30A, #30B, and #30C. Drilling and geophysical surveys indicate one large kimberlite with a minimum length of 1300 m and width of 460 m. Kimberlite #30C is approximately 18 m thick in holes drilled closest to the edge and increases to more than 100 m thick towards the center. It has an inferred potential of 63.5 million t.

A 1345 kg sample of drill core from the nine holes was treated by caustic fusion to recover 181 diamonds of which 32 were macrodiamonds (>0.5 mm) and 149 were microdiamonds. No diamonds greater than 1.2 mm in size were recovered and 152 diamonds or 84 percent were clear and white. DDH 95-1, located in the northwest sector of kimberlite #30, is the best hole, in which 60 diamonds, including 10 macrodiamonds, were recovered from 132 kg of sample.

Kennecott is now planning a new exploration program which will include an airborne geophysical survey and up to 20 more holes. Kimberlite #28 will be tested with up to 10 holes and other holes will test several targets after interpreting the airborne data. Subject to a review of the next phase of drill hole results, bulk core sampling will be undertaken. At present, the sample size is still too small to meaningfully predict carats per tonne. Kennecott Canada Inc. views as positive the joint venture's indicator minerals, quality, and preservation of diamonds, type and size of kimberlite, and the potential low cost of mining in central Saskatchewan.

Kensington Resources Ltd. is acquiring a 25 percent participating interest in the FALC joint venture for $3.4 million, to be paid directly into exploration programs over the next three years. Uranerz Exploration and Mining Ltd., Cameco Corporation, Monopros Ltd., and Kensington Resources Ltd. will then have an equal share in the project, which is currently exploring 71 magnetically defined kimberlite bodies to the northeast of Prince Albert. The 71 kimberlites of the FALC project represent one of the largest kimberlite clusters in the world, most with an estimated mass twice that of kimberlites located in other parts of the world. The region is uniquely characterized by containing nearly completely preserved kimberlite volcanoes, thus accounting for the comparatively larger mass. Uranerz continues to be project operator. Results to December 1994 show that of the 41 kimberlites tested by drilling, 32 contained microdiamonds, and 22 of these contained macrodiamonds. To the end of 1994, 540 macrodiamonds,

the largest being 0.985 carats, have been recovered. Kimberlite 122 has produced some of the largest and better quality diamonds to date. Individual bulk samples grade up to 23.4 carats per 100 t.

The joint venture's 1995 work program consisted of ground geophysics followed in early June by a total of eight mini-bulk, large diameter, reverse circulation air-blast holes drilled in separate kimberlite bodies. Three of the targets were known to be macrodiamond-bearing, one to be microdiamond bearing, while four were untested targets. Each drill hole yielded a theoretical weight of approximately 25 t. From the eight holes, 35 mini-bulk samples weighing 162.1 t and comprising only the +0.85 mm fraction have been sent to the laboratory for macrodiamond recoveries. In addition, a further 44 composite samples, each weighing about 20 kg were treated for microdiamonds (28 samples) and indicator minerals (16 samples).

The microdiamond sample analyses are reported in Table 5. A total of 58 microdiamonds were recovered from samples 147-03-01 and 147-03-02. These microdiamond counts are the highest to date from the project. The 1995 drilling brings the FALC project's total number of diamondiferous kimberlites to 33. In summary, macrodiamond grades obtained to 1994 in the FALC field are not economic, but are encouraging. Macrodiamond results for the 1995 drilling program have not yet been reported.

Kensington Resources Ltd. has elected not to exercise its rights under property option agreements dated September 26 and 27, 1994 with Altmark Energy Inc. These cover the apron deposit properties held by Rhonda Mining Corp. and Kimberwick Diamonds in the FALC area. Included in these properties are kimberlitic, volcaniclastic apron deposits around the main FALC kimberlites. The exploration targets potentially diamond-rich zones in heavy mineral layers, that may be concentrated in specific horizons by subaerial and submarine erosion and redistribution processes. To date, nine holes have been drilled into these apron deposits. Diamonds and/or diamond indicator minerals were recovered from every hole indicating the potential for economic diamond concentrations.

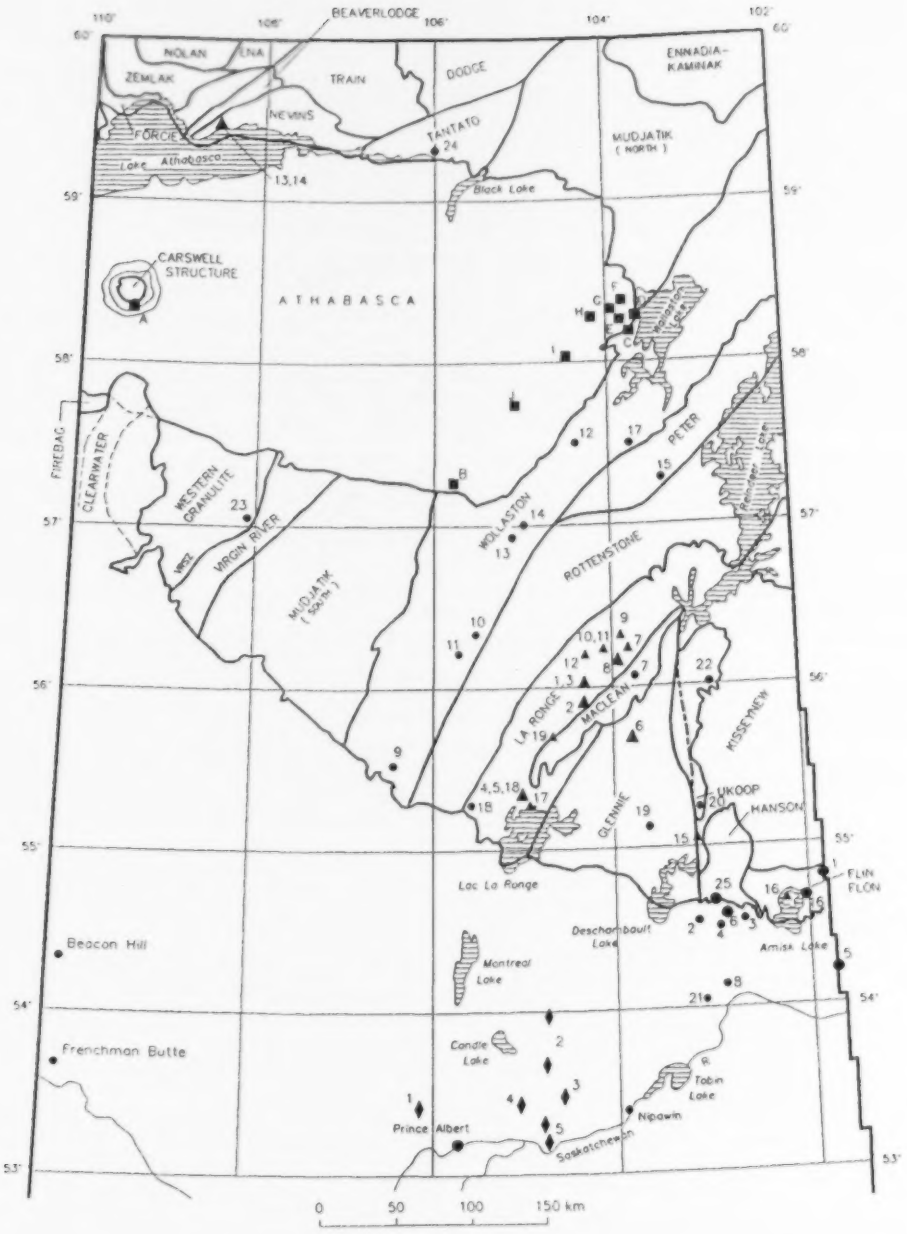
Acknowledgments

Personnel at Aur Resources; Cameco Corporation; Cigar Lake Mining Corporation; Claude Resources Inc.; Cogema Resources Inc.; Greater Lenora Resources Corporation; Golden Rule Resources Ltd.; Hudson Bay Mining and Smelting Co., Limited; Hudson Bay Exploration and Development Company Ltd.; Kennecott Canada Inc.; Kensington Resources Ltd.; Kristo Gold Inc.; Patterson Mining Geophysics Ltd.; Uranerz Exploration and Mining Ltd.; and others assisted the authors in the preparation of the report.

Table 5 - Published 1995 microdiamond results from the Fort-à-la-Corne joint venture

Kimberlite No.	Estimated Mass mt*	Sample No.	Interval From	To	Length (m)	Sample Wt (kg)	Microdiamond(s) Totals	per 10 kg
116	38	–	(No microdiamonds recovered)					
119	118	–	(No microdiamonds recovered)					
122	540	122-08-01	105.8	138.0	32.2	16	1	<1.00
		122-08-02	138.0	180.0	42.0	16	2	1.25
126	51	–	(No microdiamonds recovered)					
147	420	147-03-01	98.5	156.0	57.5	17	33	19.40
		147-03-02	156.0	213.0	57.0	17	25	14.70
140	925	140-08-01	120.0	150.0	30.0	16	0	0.00
		140-08-02	150.0	222.0	72.0	18	7	3.90
		140-08-03	222.0	264.0	42.0	19	17	8.90
		140-08-04	264.0	306.0	42.0	19	7	3.70
		140-08-05	306.0	354.0	48.0	19	9	4.70
133	53	133-01-01	112.0	168.0	56.0	17	6	3.50
		133-01-02	168.0	210.0	42.0	18	1	<1.00
		133-01-03	210.0	276.0	66.0	19	6	3.20
		133-01-04	276.0	324.0	48.0	19	0	0.00
		133-01-05	324.0	351.5	27.5	19	20	10.50
163	95	–	(No microdiamonds recovered)					

Note: *Million tonnes. Estimates based on geophyscal modelling



MINERAL DEPOSITS AND EXPLORATION AREAS

***Uranium** (squares): (A) Cluff Lake, (B) Key Lake, (C) Rabbit Lake, (D) Collins Bay–Eagle Point, (E) McClean Lake, Sue Trend, (F) Jeb, (G) Dawn Lake, (H) Midwest, (I) Cigar Lake, and (J) McArthur River, P2 North.*
***Gold** (triangles): (1) Jolu mine, (2) Jasper mine, (3) Star Lake mine, (4) Contact Lake mine, (5) Pap SW, (6) Seabee mine, (7) Weedy B–Golden Heart, (8) Komis mine, (9) Twin, (10) Corner, (11) Tower East, (12) Niko, (13) Box mine, (14) Athona mine, (15) Wood Lake, (16) Amisk Joint Venture–Laurel Lake, (17) Anglo-Rouyn Tailings, (18) Lynx Lake, and (19) Devil Lake.*
***Base Metals** (circles): (1) Flin Flon and Callinan mines, (2) Bigstone Lake, (3) McDermott Lake, (4) Miskat Lake, (5) Namew Lake mine, (6) McIlvenna Bay, (7) McKenzie/PEG, (8) Tyacke, (9) Duddridge, (10) Sito East, (11) Fable, (12) Johnson–Marina, (13) Janice, (14) Kaz, (15) Campbell River, (16) Konuto Lake, (17) George Lake, (18) Howard Lake, (19) HBED zone, (20) Satterley Lake, (21) Muskeg, (22) Pistol Lake, (23) Clearwater Anorthosite, (24) Axis-Currie-Rea, and (25) Western Nuclear mine.*
***Kimberlites** (diamonds): (1) Sturgeon Lake, (2) Candle Lake, (3) Snowden, (4) Foxford, and (5) Fort-à-la-Corne.*

SASKATCHEWAN MINERAL PROPERTIES AVAILABLE FOR OPTION

Name	Disposition Number	NTS & Domain	Commodity	Tonnage (t)	Grade	Assays	Mineralization Type	Contact
Broken Hammer	CBS 6120	64D-5 La Ronge	Au			grab 720 g/t Au	structurally-hosted quartz vein	Alligator Res. Barry Collins (306) 373-4500
Dickens Lake (Greywacke)	CBS 8911 CBS 6930 S-101079 S-99911 S-101254 S-101476 S-101817, 818 & 819	73P-15 Maclean	Au	297 710	9.2 g/t	12.7 g/t Au over 0.5m 32 g/t Au over 7.5m	disseminated gold in clastic meta-sediment	Cameco Corporation Colin Macdonald (306) 956-6346
Leland Lake	S-105029	63M-12 Glennie	Au			grab 34.5 g/t Au	Mixed silicate/ sulphide facies iron formation	David Partridge (306) 425-4498
Upises Lake	CBS 5284	73P-7 La Ronge	Au			grab 170 g/t Au	structurally-hosted quartz vein	Highrock Contracting Rod Spooner (306) 425-2828
Borys Lake	S-103486	73P-10 La Ronge/ Crew	Zn-Pb-Cu	1 212 473 Main Zone (to 30 m)	1.91% Zn + Pb	2.09% Zn 0.11% Pb 0.06% Cu 6.5 g/t Ag over 14.9 m	sediment-hosted stratiform base metal sulphide SEDEX	Spectra Management Mike Lederhouse (306) 425-2799
Brabant PEG/ McKenzie	ML 5054	64D-4 Maclean	Zn-Cu-Pb	4 860 000	5.19% Zn 0.57% Cu 0.28% Pb 22.6 g/t Ag 0.22 g/t Au		sediment-hosted stratiform base metal sulphide SEDEX/VMS (?)	Bruce Miller Boart Longyear Inc. (705) 474-2800
Brownell Lake	S-101336 S-104580	63M-4 Glennie	Zn-Cu	1 252 200	1.75% Zn 0.56% Cu		VMS	Spectra Management Mike Lederhouse (306) 425-2799
Deception Lake	CBS 64, 65 CBS 4814 S-98764	74A-9 Rottenstone	Pb-Zn-Ag-Au			grab 28.4% Pb 4.72% Zn 97 g/t Ag 3.4 g/t Au	sediment-hosted stratiform base metal sulphide SEDEX	David Partridge (306) 425-4498
Elizabeth Lake	S-103570	73P-6 La Ronge/ Nut Bay	Cu	6 077 570	0.68% Cu		VMS (?)	Claude Resources Ned Reid (306) 665-7505
HBED Zone Extension	S-104744 S-104745	63M-4 Glennie	Zn-Cu	589 680	3% Zn 0.5% Cu		VMS	Comaplex Res. Murray Pyke (403) 265-6973
Kepuch/ Ramsay/ Quandt	S-105474	63L-10 Hanson	Cu-Zn	739 050	2.15% Cu 1.77% Zn to 335 m		VMS	Highrock Contracting Rod Spooner (306) 485-2828
Mokoman Lake	ML 5269	63M-15 Kisseynew/ Scimitar	Cu	5 443 200	0.94% Cu		VMS	Copperquest Lew Parres (204) 687-3411
Pitching Lake A Zone	S-103165 to 103169	73P-8 Glennie	Cu	90 720	2.6% Cu	8.03% Cu over 5.2 m	VMS	Claude Resources Ned Reid (306) 665-7505
Axis Lake	S-103562	74P-5 Tantato	Ni-Cu-Co	3 402 000	0.6% Ni 0.6% Cu 0.15% Co		differentiated mafic (noritic) intrusion	Consolidated Pine Channel Gold Corp. Dale Hoffman (604) 684-5118
Gochager Lake Ivy	S-97963 S-97970 S-100221 S-100226 S-100227	73P-15 La Ronge/ Crew	Ni-Co-Cu	1 542 240	0.74% Ni + Cu combined		disseminated massive sulphide in mafic-ultramafic intrusion	Ron Smith (306) 425-3081
Rea Lake	S-103569	74P-5 Tantato	Ni-Cu-Co	63 867 000	0.1 % Ni 0.1% Cu		differentiated mafic (noritic) intrustion	Consolidated Pine Channel Gold Corp. Dale Hoffman (604) 684-5118